Smart System Using Solar Pannel for Irrigation

Vaibhav Dhonnar[1], Pradnya Kedare[2], Omkar Dorugade[3], Shubham Barve[4], Aamir Shaikh[5]
[1,2,3,4,5] *Pillai HOC College of Engineering and Technology, Rasayani, Maharashtra*

***Abstract*- India is the most populated country after China in India three fourth of Indians will live in cities by 2030 and water supply and demand is up to 9600 crore liter/day. As per the estimated majority of water is wastage due to overwatering which followed by traditional irrigation system by adopting smart irrigation system water wastage will below and it is the best solution. This system monitors soil condition and plant water used automatically and adjusts according to schedule. This is one-time investment project**

***Index terms*- Microcontroller, IOT, Sensors, Gsm Module**

INTRODUCTION

Agriculture is the backbone of all developed countries. It uses 85% of freshwater resources worldwide and this percentage continues to increase because of the growth of population and increasing food demand. Due to this water management is a major concern in many areas. In agriculture, two things are very important first to get information about the fertility of the soil, and second is to major moisture contained in the soil. Nowadays for irrigation different techniques are available which are used to reduce water consumption as well as a dependency on rain. In this technique all sensors are placed to the field and give current information to farmer cellular phones for about soil condition is dry or wet and accordingly, microcontroller passes signal automatically to the pump.

LITERATURE REVIEW

Joaquin Gutierrez (2013) purposed access units which transfer the information to the web application. It has a two-way communication link and it also powered by a solar panel. This two-way communication link is based on the internet for irrigation scheduling and data infection through a web page [1].

Prof C. H. Chavan and P. V. Karnade (2014) purposed a smart monitoring network for environmental parameters using Zigbee. This network sends information wirelessly to the server, which collects all information from the network and analyzes and send to farmer cellular phone. This system doesn't monitor nutrients in the soil and weather forecasting [2].

Karan Kansara (2015) proposed an automatic irrigation system that uses many sensors in the field and accordingly the temperature, humidity, and soil moisture content sensors are passed the signal to the microcontroller. This system doesn't monitor nutrient in the soil [3].

Archana and Priya (2016) proposed a paper in which soil moisture sensors and temperature sensors are placed in a field. Then these sensors will sense the value and microcontroller is used to control the supply of water in the field. This system doesn't send current information to farmer cellular phones [4].

V. R. Balaji and M, Sudha (2016) proposed a paper it uses solar panel for electricity. In this system, the soil moisture sensor is placed in a field that sends sensor information to the microcontroller and accordingly the motor pump will ON / OFF. This system doesn't monitor weather forecasting [5].

PROPOSED SYSTEM

Nowadays the agriculture field is facing various problems such as lack of rain due to global warming. To help farmers smart irrigation system is used. In this system, DHT11 and soil moisture sensor are placed in a field which sends the information to the Arduino microcontroller this sensed value from sensors are displayed in LCD. If sense value goes beyond the preset value than the pump will automatically turn off by relay circuit. In this system GSM module also used for receiving current information about land on their cellular phone.

BLOCK DIAGRAM

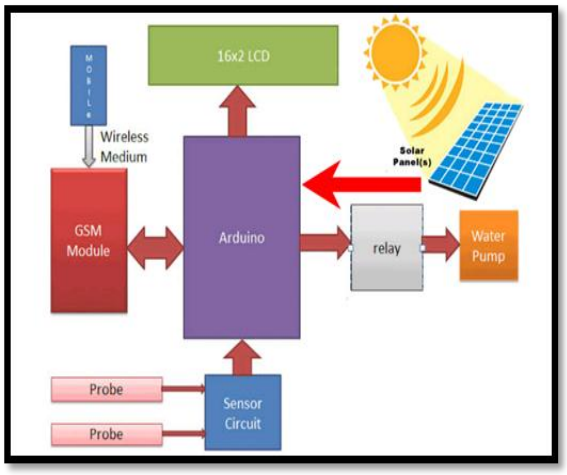

Fig (a)

ARDUINO UNO

The Arduino Uno is a microcontroller board based on the microchip ATMEGA 328P. The board has 14 input/ output pins (six capable for PWM output), 6 analog input pins and it is programmable by using Arduino IDE software via type B USB cable. It also has MHZ quartz crystal USB, an ICSP circuit, and reset.

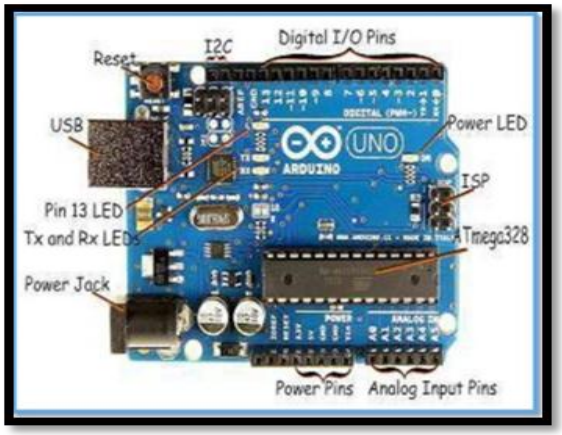

Fig (b)

SENSORS

SOIL MOISTURE SENSOR

The soil moisture sensor is used to measure the moisture content in the soil. It has two probes which used to measure volumetric contain water. The two probes allow the current to pass through the soil and then it gets resistance value to measure the moisture value. If the measured value is less than preset value 0V will be showing on LCD. If the measured value is more than preset value 5V will be shown.

SENSORS	SENSORS VALUE RANGE
Soil Moisture	-10 degree to +85 degree Celsius
DHT 11	Temp -55 degree to +150 degree Celsius Humidity 40%

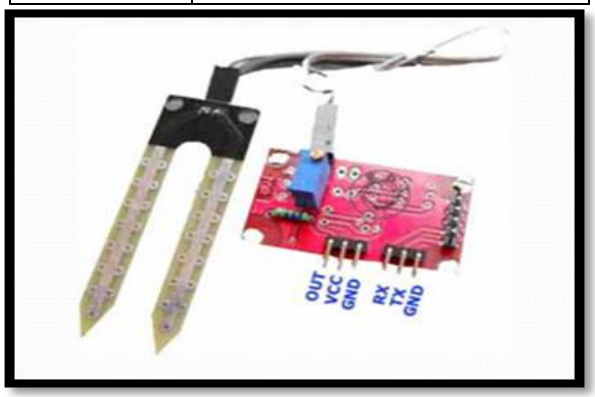

Fig (c)

DHT 11 SENSOR

DHT 11 sensors are containing temperature as well as a humidity sensor. This sensor can be easily interfaced with any microcontroller. To measure the surrounding air it uses a thermistor and capacitive humidity sensor. The temperature range of the DHT 11 sensor is 0 to 50 degrees Celsius. DHT 11 is small in size and uses a 3 to 5V supply.

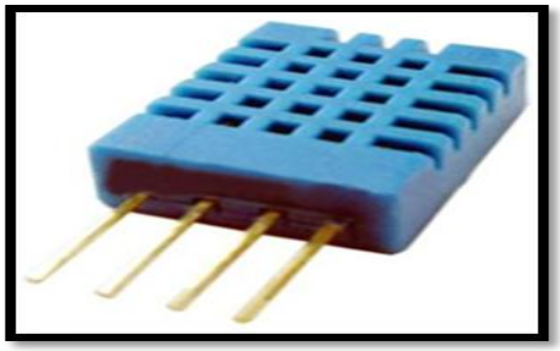

Fig (d)

WIFI MODULE

The ESP 8266 wifi module is a complete wifi network and it has inbuilt SOC. It interfaces wirelessly with any microcontroller. ESP 8266

operates at 3.6V. It has on-board processing and storage capabilities to allow easily with any sensors and other applications.

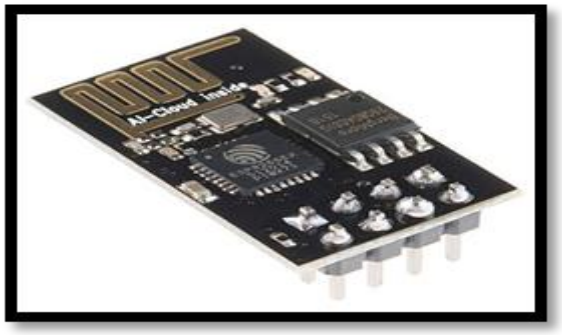

Fig (e)

GSM MODULE

GSM (Global System for mobile communication) is a mobile communication modem. It widely used mobile communication system in the world. GSM used for transmitting mobile voice and data services operates at 850MHz, 900MHz, 1800MHz, 1900MHz frequency bands. There are various sizes in the GSM system such as micro, macro, pico, and umbrella cells. The practical range of the GSM module is 35kilometer.

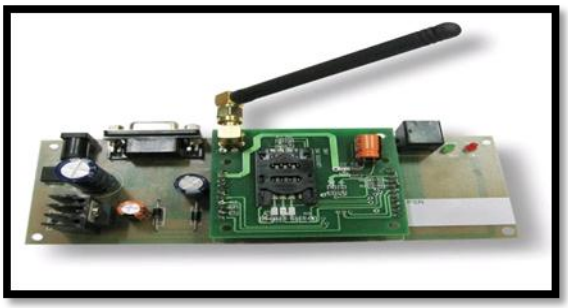

Fig (f)

RESULT

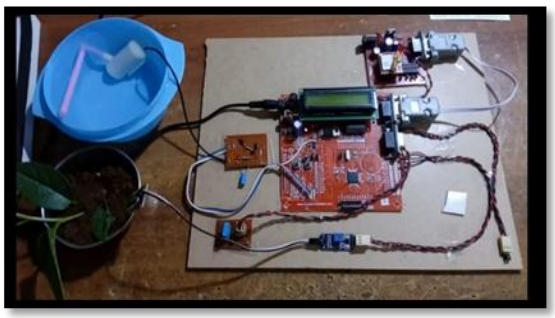

Fig (G)

CONCLUSION

The main objective of this smart irrigation system is to make it more efficient, cost-saving, and simple in use for farmers. It generally measures two parameters such as soil moisture and temperature. Due to server updates farmers can know about crop field nature anytime, anywhere.

REFERENCE

[1] Joaquin Gutierrez and Juan Francisco "Automated Irrigation System using a Wireless sensor Network and GPRS Module" (ITIM), vol-04 2013.

[2] C.H.Chavan and V.Karande," Wireless Monitoring of soil moisture, temperature and humidity using Zigbee in Agriculture" (IJETT),vol-11,May-2014.

[3] Karan Kansara and Vishal Zaweri,"GSM Based Automated Irrigation System with IOT".(IJCSIT) vol-06,2015.

[4] Archana and Priya,"Design and Implementation of Automatic Plant Watering System" (IJAEGT),vol-04, Issue-01 , Jan-2016.

[5] V.R. Balaji and M.Sudha ,"Solar Powered Auto Irrigation System" (IJETCSE),vol-20 Issue-2, Feb-2016.